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Factors Shaping Health Tourism Income in Türkiye: A Time Series Study on the Effects of Innovation, Safety and Hygiene

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Abstract

Aim: The aim of this study is to examine the effects of global innovation index, safety and security level and health and hygiene level on health tourism income.

Methods: Time series analysis was applied with Türkiye's data for the years 2012-2023. After the stationarity of the series was analyzed with Philips-Perron (PP) unit root tests, short-term and long-term relationship was examined with Johanson Cointegration test. Then, shocks occurring in the short term were calculated by applying Error Correction Model and Impulse-Response Function.

Results: While hygiene and health level (HH) positively affected health tourism income (EXP) (P<0.05), global innovation index affected it in a non-significant positive way (p>0.05). EXP variable is affected by shocks from GII, HH and SS. Therefore, health tourism income is

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significantly affected by indicators such as safety and security, innovative developments in tourism, hygiene and health level in the short term.

Conclusion: As a result, it is recommended that Türkiye should make continuous efforts towards innovation, hygiene and security elements in order to realize its health tourism potential. The meticulous handling of these elements by stakeholders will strengthen the country's position in the field of health tourism and increase its health tourism income by ensuring that it assumes a more competitive role in the international market.

Keywords: Hygiene, health tourism income, innovation, security, time series analysis, Türkiye

INTRODUCTION

As a result of the desire to meet health services abroad due to reasons such as long waiting times, high costs and access barriers, health tourism mobility has become a rapidly growing and remarkable sector at the global level (Connell 2006). Türkiye is also among the destinations preferred by citizens of developed countries as a health tourism destination. Because Türkiye is a destination that has attracted the attention of health tourists by offering relatively low-cost and high-quality health services in a shorter time (Çapar 2018; Özer and Songür 2013; Sosysal 2017). Türkiye can also be expressed as an important actor that can meet the demand for health tourism worldwide by combining health services with classical tourism types such as cultural, historical, sea, sand and sun. Türkiye highlights its role in health tourism with the marketing strategies of the International Health Services Corporation (USHAŞ) for health tourism destinations, which work in coordination under the leadership of the Ministry of Health, and the inspection, control and quality studies of the Presidency of Health Tourism based on health tourism legislation. Because it is extremely important for these institutions and organizations to come together as stakeholders. In fact, the studies conducted have shown that these stakeholders should work in a coordinated manner (Çapar and İnan 2024). It is thought that Türkiye's health tourism income will increase when relevant stakeholders work together to determine strategies and policies.

There are many factors that determine the choice of health tourism destination and affect health tourism income. The most important of these factors are the quality health services, hygiene level, low prices, low waiting times, security level (Çapar and Aslan 2020) and technological innovation (Panasiuk 2018). Most of these factors have been analyzed in various scientific studies together or separately in models regarding the effects of destination selection (Çapar 2018; Çapar

and Aslan 2020; Jovanović et al. 2015; Konak 2022; Kumar et al. 2016; Mataković and Mataković 2019; Panasiuk 2018; Sultana et al. 2014). Among these studies, the master's thesis conducted by Çapar (2018) in Türkiye and another study conducted by Çapar and Aslan (2020) addressed the level of security and hygiene, and it was reported that these two variables were important variables in destination selection. Similarly, a study conducted in Malaysia also stated that the relevant factors are important in destination selection (Kumar et al. 2016). In addition to these studies, Mataković and Mataković (2019) revealed that security is an important factor for health tourism, and Jovanović et al. (2015) and Konak (2022) revealed that hygiene is an important factor for health tourism.

The effect of innovation, one of the important factors of the current study, on health tourism was examined by Panasiuk (2018). In this study, it was revealed that the innovation variable is effective in health tourism destination selection and therefore has the potential to positively affect health tourism income. Innovation and technology affect the destination choice of health tourists. This situation shows that innovation can indirectly affect health tourism income. Therefore, unlike the other two variables in the model of the study, safety and hygiene, innovation is remarkable in terms of having an indirect effect. In fact, the findings reported in a study conducted by Godovykh et al. (2022) support this situation. In addition, in a study conducted by Vellas (2011), the indirect effects of the tourism economy are mentioned. In a study conducted by Szymanska and Panfiluk (2019), it was reported that innovations and technologies in health tourism positively affect the preferability of health tourism and therefore health tourism income. As can be understood from these studies, innovation and innovation in health tourism indirectly affect health tourism income and this effect, unlike the level of safety and hygiene, can reveal unconsidered factors of health tourism income.

Considering the information from the above studies, it can be stated that security, hygiene and innovation affect health tourism destination selection and therefore health tourism income. Despite this effect, it is seen that a model in which the relevant variables work together is not reflected in the literature. This situation shows the necessity of the potential of these variables to affect health tourism together in the same model in the literature. This current study, unlike the studies given above, attempts to reveal the variables of safety, hygiene and innovation in the same model using the time series analysis method, which is a method that will take into account long-term results. This situation constitutes the motivation for the current study. Because it is thought

that the empirical results to be obtained from this study will fill this gap in the literature and provide evidence to the relevant health tourism stakeholders. In this way, it will be understood that safety, hygiene and innovation are important determinants of health tourism income and evidence will be provided for strategies to increase the income of health tourism. Innovative approaches in health services and developments in medical technology enable countries to gain competitive advantage in the health tourism market. The existence of applications requiring innovation, such as innovative medical technologies, is a situation that can be revealed by the global innovation index. For this reason, the global innovation index is a critical factor affecting health tourism income (Ryndach et al. 2024). Because the developments and innovations in health technologies that countries have can increase the quality of service and directly affect the preferences of health tourists, thus encouraging growth in the health tourism economy (Ateş and Sunar 2024). Because telemedicine applications and remote patient or result monitoring systems used in the field of health tourism in recent years contribute to the development of the health tourism sector by eliminating the barriers to accessing health services.

In the post-pandemic period, the increased trust in hygiene standards shapes patients' preferences and makes it mandatory for countries to pay attention to hygienic conditions while providing health services (Chen and Wilson 2013; Konak 2022). For this reason, the hygiene level of countries is an important factor that is expected to positively affect the choice of health tourism destination and, accordingly, health tourism income. Hygiene is perceived as an indicator that determines the quality of health services and is therefore an important criterion that patients take into consideration when choosing health tourism destinations (Lee et al. 2020; Alkier et al. 2022). It is thought that countries that increase their hygiene standards will have the potential to attract more tourists by gaining the trust of international patients, which will increase the country's health tourism income. Another important factor that is thought to affect health tourism income is the country's safety and security level. The country's score regarding safety and security is an indispensable criterion for the sustainability of health tourism. Health tourists' feeling safe in their preferred health tourism destinations increases their trust in the country and positively affects their receipt of health services (Mataković and Mataković 2019; Santana Gallego et al. 2019; Akamavi et al. 2023). Health services provided in a safe environment increase the psychological and physical comfort of patients and positively affect health tourism revenues (Sultana et al. 2014; Çapar and Aslan 2020). Security plays a critical role not only in the physical sense but also in

terms of reliability in the provision of health services. Therefore, it can be stated that health tourism destinations should develop strategies focused on security. This study aims to reveal how much, in what direction and in what way the factors of security, hygiene and innovation, which are thought to affect health tourism revenue, affect Türkiye's health tourism revenue. In this way, it is aimed to take these factors into consideration in order to increase Türkiye's health tourism potential and to develop strategic suggestions for the future of health tourism by demonstrating with evidence whether these factors have a critical importance in achieving long-term sustainable growth.

1. RESEARCH METHODOLOGY

The method of the study, data sources, data format, the abbreviation of the data passed to the model and the information about what it means, and the assumptions of the model are detailed below under subheadings.

1.1. Type and Model of the Study

The type of this study is longitudinal research. The analysis method of the study is time series analysis. The model of this study was determined as a relational screening model, which is one of the causal comparison subtypes of the quantitative research method.

1.2. Variables and Data Sources of the Study

In this study, health tourism income was included in the model as a dependent variable, safety and security, global innovation index, hygiene and health level as independent variables. In the study, Türkiye's data on the relevant variables between the years 2012-2023 were examined. Abbreviations, explanations and data sources regarding the variables of the study are given in Table 1.

Table 1. Study variables, abbreviations, values and sources

Dependent variable	Description	Abbreviation	Lowest-highest value and unit	Source
Health tourism income	Annual average health tourism revenue per health tourist	EXP	Varies according to the number of health tourists and the year. As the amount increases, the income increases. Unit is US dollars.	TUIK
Independent variable				
Safety and security level	An index that reveals the cost of widespread crime and violence, as well as terrorism, and the extent to which police services can be relied upon to provide protection from crime.	SS	Lowest score=0, highest score=7.	World Economic Forum
Health and hygiene level	An index that determines a country's health and hygiene level according to some parameters.	HH	Lowest score=0, highest score=7.	World Economic Forum
Global innovation index	An index that evaluates a country's inputs and outputs related to innovation and innovation.	GII	Lowest score=0, highest score=100.	World Intellectual Property Organization (WIPO)

Source: (World Economic Forum 2021; The World Intellectual Property Organization (WIPO) 2024; Turkish Statistical Institute (TUIK) 2024).

1.3. Data Analysis of the Study

First of all, the stationarity of the series was analyzed with the Philips-Perron (PP) unit root test in the study. Since the series were stationary at level I (1), appropriate lag lengths were determined. Then, the short-term or long-term relationship was examined with the Johanson Cointegration test. As a result of proving a long-term relationship, shocks occurring in the short term were calculated by applying the Error Correction Model and Impulse-Response Function.

The stationarity of the series included in the analysis in the study is of great importance for Time Series Analysis estimation methods. If the analysis is continued with non-stationary series, it causes spurious regression (Onafowora and Owoye 2015). This situation shows that the results obtained from the study are not reliable (Baumöhl and Lyócsa 2009). In order for a series to become stationary, the difference process is applied. As a result of this process, the variable d. If it becomes stationary after taking the difference of times, it is decided that it is a stationary series of degree (d) (Karanfil and Kılıç 2015).

1.4. Unit Root Tests

Philips-Perron (PP) Unit Root tests were applied to determine the stationarity of the variables considered in the study. The Philips-Perron (PP) Unit Root Test, developed by (Perron 1989), is a preferred test to test whether any series contains a unit root. According to the Philips-Perron unit root test, if the calculated statistical values are greater than the value specified in the confidence interval in absolute value, it indicates that the basic hypothesis is not accepted, that is, the H0 hypothesis is rejected. In this case, it indicates that the series does not contain a unit root and has become stationary (Perron 1989). The Philip-Perron unit root test was preferred because it makes more robust and strong estimates than the ADF test, taking into account the autocorrelation and heteroscedasticity problem (Afriyie et al. 2020). If the H0 hypothesis is accepted as a result of this test, it is stated that the variables do not contain a unit root and have become stationary (Heymans et al. 2014). If these variables become stationary at the same level, the short-term and long-term relationship is examined with the Johanson Cointegration Test. If the test statistics calculated here are greater than the value specified in the confidence interval in absolute value, the basic hypothesis explaining that there is no cointegration is rejected. This situation explains the existence of a long-term equilibrium relationship (Yavuz and Zhalelkanova 2018).

1.5. Johansen Cointegration Analysis

In the first stage of the research, after examining the stationarity of the series, appropriate lag lengths are calculated. In the second stage, the Johansen Cointegration Test was applied to examine a short- or long-term equilibrium relationship between series with linear combinations (Ivascu et al. 2021). The Johansen Cointegration Test provides information about the short- or long-term relationship by taking into account statistical criteria such as trace and eigenvalue (Khan et al. 2023). In this regard, if the calculated trace and eigenvalues are greater than the critical value in

absolute value, it means that the basic hypothesis is rejected. This situation supports a long-term cointegration relationship in the series (Solanki et al. 2020).

1.6. Error Correction Model and Impulse Response Function Analysis

If there is a long-term relationship as a result of the cointegration analysis, the Vector Error Correction Model is applied to detect the dynamics occurring in the short term (Albayrak 2021). After this model, the effect of shocks between variables is determined by the impulse response function. The impulse response function is an estimator method that describes the time-based effects of shocks occurring in the short term among variables over a certain time interval (Barratt et al. 2019).

2. ANALYSIS

The model includes four variables, one dependent and three independent, and 12 observations. According to the descriptive information regarding these variables, the average health tourism income or expenditure (EXP) per health tourist is approximately 2188±587 dollars. High values indicate high health tourist income. The average health and hygiene level (HH) is approximately 5±0.3 points. The HH variable varies between 0 and 7. High HH scores indicate a high level of hygiene. The average safety and security (SS) is approximately 4±0.38 points. The safety and security (SS) variable is also a variable that varies between 0 and 7 and indicates a higher level of safety and security as it increases. The global innovation index (GII) also indicates the existence of a low global innovation index with an average of approximately 37±1.59 points. Because this index reflects a situation where values range from 0 to 100 and high values are good.

Table 2. Tests for Autocorrelation and Heteroskedasticity in Regression Model

Breusch-Pagan/Cook-Weisberg Test	Chi2 (1) = 2.99
	Prob>chi2 = 0.0436
Durbin-Watson Test	(5, 12) = 2.42979

Based on the Table 2, hypothesis H0 is rejected (P<0.05). Hence, the problem of heteroskedasticity is determined. This implies that the variance of the error term changes in the model. The Durbin-Watson test is greater than 2 in the model, meaning that there is negative autocorrelation (2<2.42979).

Table 3. Philips-Perron (PP) Unit Root Test

PP Test	Trended			Trendless		
Variables	Test Statistics	Significance Level (5%)	Significance Level (10%)	Test Statistics	Significance Level (5%)	Significance Level (10%)
EXP	-2.066	-3.600	-3.240	-2.306	-3.000	-2.630
difEXP	-2.681	-3.600	-3.240	-2.807	-3.000	-2.630
HH	-3.750	-3.600	-3.240	-3.758	-3.000	-2.630
difHH	-5.824	-3.600	-3.240	-5.732	-3.000	-2.630
SS	-2.434	-3.600	-3.240	-1.474	-3.000	-2.630
difSS	-3.477	-3.600	-3.240	-3.527	-3.000	-2.630
GII	-2.594	-3.600	-3.240	-2.904	-3.000	-2.630
difGII	-3.273	-3.600	-3.240	-3.491	-3.000	-2.630

Table 3 shows the unit root test results for the series at level I (0) and level I (1). According to the Philips-Perron (PP) unit root test, the test statistics values calculated for the variables EXP, HH, SS, GII and PC, depending on the trend and non-trend conditions, are greater than the critical value within the absolute value at the 5% and 10% confidence intervals, and therefore the H0 hypothesis indicating the presence of a unit root is rejected. As a result, it was decided that the series was stationary at level I (1).

Table 4. Lag Lengths

Lag	LogL	LR	FPE	AIC	HQ	SC
0	-68.217	.	819.1	18.054	17.786	18.094
1	98.621	333.68	8.100*	-19.655	-20.994	-19.456
2	968.884	1740.5	.	-234.221	-236.364	-233.903
3	986.733	35.698*	.	-238.683*	-240.827*	-238.366*
4	979.308	-14.852	.	-236.827	-238.97	-236.506

According to Table 4, the existence of a long-term relationship in series that are stationary at similar levels is important. The existence of a short-term and long-term relationship between variables that are stationary at the same level was analyzed with the Johansen Cointegration test. Before the cointegration analysis, the lag lengths were calculated. According to LR: test statistics, FPE: Final Forecast Error, AIC: Akaike information criterion, HQ: Hannan-Quinn information criterion and SC: Schwarz information criterion, the lag length was determined as 3.

Table 5. Johanson Cointegration Test

Maximum order	Eigenvalue (Trace Statistics)	5% Critical Value
0	1042.867	47.21
1	740.456	29.68
2	463.970	15.41
3	194.162	3.76
4		
Maximum order	Eigenvalue Statistics (Maximum)	5% Critical Value
0	302.411	27.07
1	276.485	20.97
2	269.808	14.07
3	194.162	3.76
4		

According to the information given in Table 5, there is a cointegration vector showing long-term equilibrium relations. Since the calculated Trace statistic value is greater than the 5% critical value, the H0 hypothesis is rejected. The information given in Table 5 proves that there is a long-term equilibrium relation.

Table 6. Error Correction Model

Variables	RMSE	R^2	Chi^2	$P>Chi^2$
D_EXP	466.544	0.916	32.838	0.0000
D_HH	0.348	0.906	29.115	0.0001
D_SS	0.387	0.680	6.382	0.3817
D_GII	1.762	0.843	16.140	0.0130

According to the information given in Table 6, the Error Correction Model was applied to calculate the shocks that occurred in the short term after a long-term relationship was detected. A strong balance relationship was detected between the EXP, HH and GII variables. As a result, it shows that the model works harmoniously.

Table 7. Short-Term Forecast Results with Error Correction Model

	Variables	Coefficients	Standard Deviation	P>IzI
D_difEXP	_ce1	-1.221	0.498	0.014
	difEXP(LD.)	0.613	0.570	0.282
	difHH(LD.)	1196.519	456.042	0.009
	difSS(LD.)	529.778	557.086	0.002
	difGII(LD.)	-69.105	97.116	0.477
	Sabit	-3.850	160.965	1.000
D_difHH	_ce1	-0.000	0.000	0.010
	difEXP(LD.)	0.000	0.000	0.103
	difHH(LD.)	-0.147	0.340	0.665
	difSS(LD.)	-0.226	0.415	0.585
	difGII(LD.)	0.140	0.072	0.053
	Sabit	-0.070	0.120	0.559
D-difSS	_ce1	-0.000	0.000	0.065
	difEXP(LD.)	0.000	0.000	0.213
	difHH(LD.)	0.361	0.379	0.340
	difSS(LD.)	-0.362	0.463	0.434
	difGII(LD.)	0.040	0.080	0.614
	Sabit	-0.015	0.133	0.909
D_difGII	_ce1	0.001	0.001	0.412
	difEXP(LD.)	-0.000	0.002	0.990
	difHH(LD.)	-2.191	1.722	0.203
	difSS(LD.)	-0.727	2.104	0.730
	difGII(LD.)	-0.649	0.366	0.077
	Sabit	-0.053	0.608	0.930

In Table 7, the hygiene and health level (HH) variable has significantly and positively affected the health tourism income (EXP). In other words, the previous period values of the hygiene and health level positively affect the health tourism income (P=0.009). The previous value of the global innovation index (GII) has positively affected its current period value (p=0.077) and is close to the significance limit. According to the model findings, the fact that the error correction terms of health tourism income (EXP) and hygiene and health level (HH) are significant indicates that they will move together in the long term.
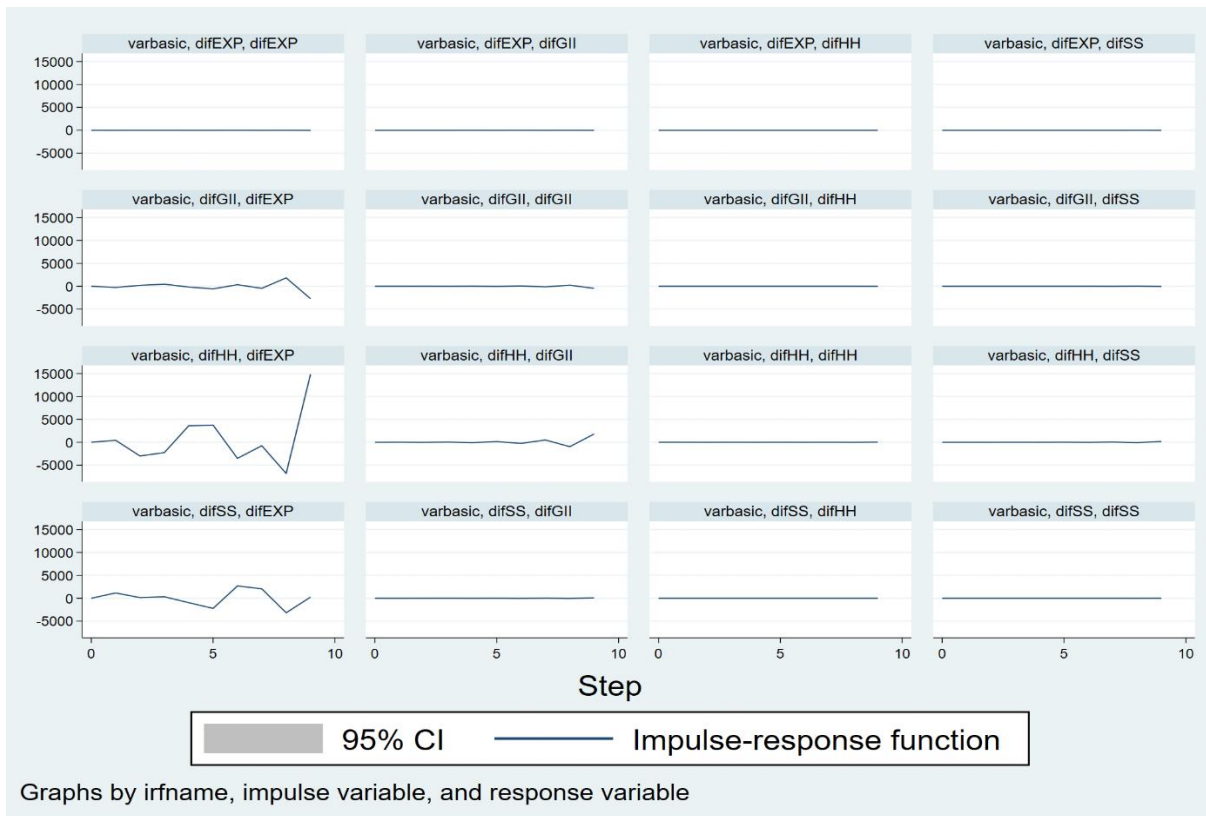
Figure 1. Action-Response Analysis Results

In the impulse response function, when a shock is applied to the series, the effect of this shock should decrease and approach zero and reach equilibrium again. In the graph given in Figure 1, short-term shocks are analyzed with the impulse response function. The EXP variable is affected by shocks from GII, HH and SS. Shocks to the GII variable affected the EXP variable positively and then negatively after approximately the 8th year. Shocks occurring in the HH variable affect the EXP variable irregularly until approximately the first 8 years. Shocks occurring in the HH variable after the eighth year increased the EXP variable positively and significantly. The effects (shocks) in the SS variable kept the EXP variable close to the equilibrium point until the first 5 years. After the fifth year, the SS variable caused irregular responses in the EXP variable, both positively and negatively. According to the findings, shocks to the HH and SS variables affect the EXP variable positively and shocks to the GII variable affect the EXP variable negatively in the approximately 8th year. As a result, health tourism income is significantly affected by indicators such as safety and security, innovative developments in the field of tourism, and hygiene and health levels in the short term.

3. DISCUSSION

Health tourism has become a critical area in terms of meeting the health needs of individuals and contributing to the economic growth of countries. Türkiye, thanks to the provision of health services combined with its traditional tourism potential, attracts attention as a rapidly rising destination in this field (Tontus and Nebioglu 2018). However, certain elements need to be meticulously addressed for the sustainable growth of the health tourism sector. In this context, the importance of innovation, hygiene and security elements becomes even more evident (Panasiuk 2018; Szymańska and Panfiluk 2020). According to the findings, health tourism income is significantly not affected by innovative developments in the field of tourism in the short term. This finding is unsimilar to other studies in the literature. In fact, according to the studies conducted, it has been reported that innovation-related activities increase health tourism income by affecting health tourism preferences (Panasiuk 2018; Ryndach et al. 2024; Szymańska and Panfiluk 2020). According to previous studies and the findings of the current study, innovation is an important determining factor for the future of health tourism. Because the integration of innovative applications and technologies in health services not only increases the quality of service, but also increases the international competitiveness of countries like Türkiye (Erbayraktar et al. 2022). For example, Türkiye's development of innovative solutions such as telemedicine and remote monitoring systems in the health sector improves patients' service experiences while providing the opportunity to reach a wider patient group (Sun 2018; Vudathaneni et al. 2024). However, it is thought that continuous investment and training are necessary for the sustainability of innovation. For this reason, it can be stated that providing the necessary support for professionals and institutions working in the field of health tourism to adapt to innovative applications is of vital importance. In fact, some studies have revealed this situation (Gür et al. 2013; Pirnar 2024; Stoumpos et al. 2023).

It was determined that hygiene and health levels are also important factors affecting health tourism income. In fact, if the hygiene and health level increases by one unit, the health tourism income increases by approximately 1196,519 Turkish liras. This finding actually shows how much importance health tourism service providers should give to hygiene and health levels. This finding is similar to the results of other studies in the literature. Because according to the results of some studies, hygiene standards are seen to be one of the most critical elements affecting health tourism income. The importance of hygiene has increased especially in the post-pandemic period (Chandra

et al. 2022; Serra and Seabra 2023). Patients should consider the hygiene standards of the country where they will receive health services, which necessitates countries providing health services to improve themselves in this regard (Jovanović et al. 2015; Rasethuntsa 2022). In the light of these findings, health tourism destinations are expected to constantly take measures to increase hygiene standards in the provision of health services. They should also announce the measures they take internationally. Only in this way will the promotional activities of health tourism achieve their goal. Because the perception of hygiene is not limited to physical cleanliness. Hygiene also reinforces the sense of trust that patients feel while receiving services (Çapar and Aslan 2020; Chandra et al. 2022).

Another important finding from this study is the determination that the level of safety and security affects health tourism income. This effect shows that a one-unit increase in safety and security increases health tourism income by 529,778 Turkish liras. This finding is extremely important in terms of revealing the importance that should be given to safety and security. In fact, security is an indispensable element for the sustainability of health tourism. According to a study conducted by Toker and Emir (2023) on the subject, it was reported that safety and security phenomena are important variables in tourism. These findings showed an expected effect. Because tourism, by its nature, can contain some risks related to security (robbery, accident, harassment, etc.). These risks are risks that Türkiye, as well as other countries, are trying to minimize. This situation directly affects the perception of security of international patients who will receive health services (Boguszewicz-Kreft et al. 2022). This effect affects patients' preferences and therefore health tourism income.

It can be stated that Türkiye's strengthening of its security strategies has become an important necessity not only for health tourism but also for the general tourism sector. Because health services provided in a safe environment can positively affect Türkiye's health tourism revenues by increasing the psychological and physical comfort of patients. In addition, improvements in security will also strengthen Türkiye's reputation in the global health tourism market (Han et al. 2021; Ruiz et al. 2021; Collins et al. 2022). As a result, in order to increase Türkiye's health tourism potential, innovation, hygiene and security elements should be emphasized. The integration and development of these factors can make Türkiye, a strong actor in the field of health tourism. However, it should not be forgotten that a continuous development and adaptation process is inevitable to achieve these goals (Uslu et al. 2021). The development of a

common strategy by all stakeholders in the health tourism sector by focusing on these elements will play a critical role in Türkiye's sustainable growth goals (Çapar 2022).

In addition to the strengths of this study, it is a fact that it was conducted under some limitations and has weaknesses, as in every study. In fact, since the data year in this study is 12 and the number of observations is low, the fact that the tests conducted in this study may have been weak can be considered as an important limitation. On the other hand, the fact that the study is limited to only Türkiye data should be considered as an important limitation in terms of producing generalizable results. In this context, it should be kept in mind that the study has important but valid results under some criteria. It is recommended that these limitations be eliminated with future studies. In this sense, it is recommended that future studies be conducted multi-centered and examined with different methodologies.

4. CONCLUSIONS

Health tourism is emerging as a critical new economic area that makes significant contributions to Türkiye's economic growth and increases its competitiveness in the international arena. In this context, the importance of innovation, hygiene and security elements in terms of the sustainability of health tourism cannot be ignored. The integration of innovative health practices and technological developments with health tourism will both increase service quality and increase Türkiye's health tourism potential by ensuring patient satisfaction. However, continuous training and investment should be made in this process and healthcare professionals should be equipped with innovative solutions.

Increasing hygiene standards in the post-pandemic period has become one of the most important elements of competitiveness in the field of health tourism. Raising national and international standards to strengthen Türkiye's perception of hygiene will reinforce patients' sense of trust and increase trust in the country's healthcare services. In addition, it should not be forgotten that hygiene should not be limited to physical cleanliness but should also include patients' experiences.

The security element is a critical factor for the sustainability of health tourism. Although Türkiye's geographical location brings some risks, effective management of these risks is essential for patients to receive safe service. Strengthening security strategies will have positive results for both health tourism and the general tourism sector.

It is possible to demonstrate the impact of innovation on health tourism income with some concrete quantitative examples. For example, with tele-television and remote connections, it is now possible for individuals in remote locations to participate in health tourism mobility. In particular, the ability of some patients who cannot participate in health tourism mobility due to distance and time constraints to receive services within the scope of health tourism will increase health tourism income.

Another important development in innovation, artificial intelligence and in-depth examination of big data can diagnose patients and especially determine conditions such as genetic predispositions. In this way, health tourism income can be indirectly increased with a personalized health service plan.

With innovative methods such as virtual and augmented reality, patients can be given the experiences they want in advance. This can create more demand by eliminating patients' doubts. This can positively increase health tourism income.

Another important technology is that health tourism income can be increased by facilitating the management of health data with wearable technologies and increasing satisfaction.

As a result, Türkiye needs to make continuous efforts towards innovation, hygiene and security elements in order to realize its health tourism potential. Addressing these elements meticulously will strengthen the country's position in the field of health tourism and increase health tourism income by ensuring that it assumes a more competitive role in the international market.

In light of this information, the following suggestions can be made:

1. Innovation positively affects health tourism income. Accordingly, especially health service providers and other health tourism stakeholders should give the necessary importance to innovation in every field of health tourism and make these innovations continuous in order to reach potential health tourists. In this regard, especially big data, which is one of the popular technologies of recent years, should be processed and artificial intelligence-supported data analytics should be performed to reveal the tendencies of health tourists. In this way, more effective strategies can be developed. Again, it is necessary to increase patient satisfaction by ensuring the use of relevant health technologies.

2. In order to increase the level of hygiene, necessary in-house and external trainings should be provided to health workers and these trainings should be made continuous. Health workers

should be trained and certified by making this awareness an institutional culture and internal and external hygiene awareness.

3. All kinds of precautions should be taken regarding security and this should be supported by various certifications and good practices. In order to ensure the safety of both healthcare professionals and health tourists, it is necessary to minimize any security vulnerabilities originating from data security, cyber attacks or other institutions and employees. It is necessary to declare and promote these security measures and to commit to the safety of individuals.

4. Health tourism stakeholders should provide all kinds of support to increase hygienic, innovative and reliable practices in every field concerning health tourists. In this regard, it should be constantly monitored by inspecting whether all health tourism stakeholders fulfill their responsibilities.

5. Some negative situations experienced in Türkiye recently have led health tourism politicians to take action and ensure that health tourism and tourist health regulations are revised. In fact, the fact that the new health tourism and tourist health regulation updated on April 26, 2025 has been changed especially in favor of health tourism quality and safety shows that the results of the current study are remarkable in terms of trust and security and are important in terms of providing the evidence that politicians want in this sense. Because these developments in health tourism regulations will often restore the negative image of Türkiye in the foreign press to a positive one and ensure that this image is protected without being damaged.

6. It is essential that health tourism policy is structured in an evidence-based manner. In particular, the scientific findings of this study show why the steps that politicians should take in terms of innovation are important. Therefore, it has been demonstrated once again how necessary and income-generating innovative innovations are, especially in the context of post-COVID-19 remote health applications.

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